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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,899	02/24/2004	Zi-Kui Liu	59516-052	1022

20277 7590 02/17/2005

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EXAMINER

TALBOT, BRIAN K

ART UNIT PAPER NUMBER

1762

DATE MAILED: 02/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/784,899

Applicant(s)

LIU ET AL.

Examiner

Brian K Talbot

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/24/04; 1/07/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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1. Claims 1-17 remain in the application.

*Election/Restrictions*

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-15 and 17, drawn to a method of making a magnesium boride film, classified in class 427, subclass 62.
  - II. Claim 16, drawn to a multi-layered structure comprising magnesium boride, classified in class 428, subclass 930.

The inventions are distinct, each from the other because of the following reasons:

3. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process including vaporizing both materials by CVD methods at the same time or combining powdered materials together and heating to form the film.
4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
5. During a telephone conversation with Daniel Bucca on 2/15/05 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-15 and 17. Affirmation of this

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election must be made by applicant in replying to this Office action. Claim 16 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

***Claim Rejections - 35 USC § 112***

7. Claims 1-15 and 17 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for forming a superconductive magnesium diboride film, does not reasonably provide enablement for forming magnesium diboride that is not superconductive. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8,10-12,14,15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng et al. (6,797,341).

Zeng et al. (6,797,341) teaches method of producing boride thin films which combines physical and chemical vapor deposition to form magnesium diboride films. Magnesium vapor is physically generated in a chamber with a substrate and a boron precursor is introduced into the chamber to form the magnesium diboride film (abstract). Carrier gases of hydrogen or nitrogen can be used to introduce the boron precursor. Pressure in the chamber is from 1-1000 torr. The substrate can be a SiC. Boron sources can be diborane, boron tribromide, trimethyl boron etc. Magnesium is heated to between 700-760 C to form the vapor. MgO is suppressed at the interface of the magnesium film and the Al<sub>2</sub>O<sub>3</sub> substrate. (col. 3, line 35 – col. 9, line 60).

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(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-8,10-12,14,15 and 17 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by Zeng et al. "In situ epitaxial MgB<sub>2</sub> thin films for superconducting electronics".

Zeng et al. "In situ epitaxial MgB<sub>2</sub> thin films for superconducting electronics" teaches method of producing boride thin films that combines physical and chemical vapor deposition to form magnesium diboride films. Magnesium vapor is physically generated in a chamber with a substrate and a boron precursor is introduced into the chamber to form the magnesium diboride film (abstract). Carrier gases of hydrogen or nitrogen can be used to introduce the boron precursor. Pressure in the chamber is from 100-700 torr. The substrate can be a SiC. Boron sources can be diborane, boron tribromide, trimethyl boron etc. Magnesium is heated to between 700-760 C to form the vapor. MgO is suppressed at the interface of the magnesium film and the Al<sub>2</sub>O<sub>3</sub> substrate. Phase diagrams indicate only MgB<sub>2</sub> formation and no Mg-Si. (pg. 1-4).

While the Examiner acknowledges the fact that the references are silent upon an interface between the magnesium film and the silicon containing substrate, it is the Examiner's position that since the process, materials and coating parameters are similar, the absence or suppression of an interface film would be achieved by the prior art. In addition, the references talk about suppressing the formation of MgO with an Al<sub>2</sub>O<sub>3</sub> substrate and this would suggest a suppression with other substrates.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9,13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng et al. (6,797,341) or Zeng et al. "In situ epitaxial MgB<sub>2</sub> thin films for superconducting electronics".

Features described above over Zeng et al. (6,797,341) or Zeng et al. "In situ epitaxial MgB<sub>2</sub> thin films for superconducting electronics" are incorporated here.

Zeng et al. (6,797,341) or Zeng et al. "In situ epitaxial MgB<sub>2</sub> thin films for superconducting electronics" fail to teach the pressure of the vapor satisfying the claimed equation.

While the Examiner acknowledges this fact, it is the Examiner's position that the pressure of the vapor is a "result effective" variable that is optimized by one skilled in the art at the time the invention was made through routine experimentation. If Applicant disagrees, Applicant is invited to supply a showing of unexpected results regarding the claimed vapor pressure and the Examiner will reconsider his position. Applicant is reminded that all claims must be commensurate in scope with the showing, i.e. all the claims should require the claimed pressure equation.

***Double Patenting***

10. Claims 1-15 and 17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 6,797,341. Although the conflicting claims are not identical, they are not patentably distinct from each other because the only difference claimed is that the instant claims recite substantially free of magnesium-silicon contaminants which would be inherent as the process steps, materials and parameters are very similar.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).




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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 2/15/05  
Brian K Talbot  
Primary Examiner  
Art Unit 1762

BKT